



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/790,757

03/03/2004

Akira Maeda

402989

2915

23548

7590

12/01/2005

LEYDIG VOIT & MAYER, LTD  
700 THIRTEENTH ST. NW  
SUITE 300  
WASHINGTON, DC 20005-3960

EXAMINER

NOVACEK, CHRISTY L

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 12/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/790,757	<b>Applicant(s)</b> MAEDA ET AL.	
	<b>Examiner</b> Christy L. Novacek	<b>Art Unit</b> 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 September 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 2-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6 is/are allowed.
- 6) ☒ Claim(s) 2-5 and 7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This office action is in response to the amendment filed September 7, 2005.

#### ***Drawings***

Applicant's arguments regarding the objection to the drawings stated in the previous office action is sufficient to overcome the objection. Therefore, this objection to the drawings is withdrawn.

#### ***Response to Amendment***

The limitations added to claim 6 are sufficient to overcome the Parrish et al. (US 6,550,665) and Mertol et al. (US 6,818,996) references, either alone or in combination. Therefore, the rejection of claim 6 under 35 U.S.C. 103(a) is hereby withdrawn.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 2, 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrish et al. (US 6,550,665) in view of Mertol et al. (US 6,818,996).

Regarding claim 7, Parrish discloses an electrode that includes a first and second metallic layer lying from an outermost surface of the metal electrode toward the substrate in this order, such that the first metallic layer (220) has tin as a principal constituent and the second metallic layer (230) includes a metallic element which produces a eutectic reaction with tin and the melting point of the first layer is higher than the melting point of the second layer and a circuit card including a carrier base and a wiring layer (215) including a metal which is capable of

Art Unit: 2822

diffusing with time when heated (col. 4, ln. 59 – col. 7, ln. 5). Parrish does not specifically disclose that the metal electrode is built on a wire. Mertol discloses that it is conventional in the art for an integrated circuit to have the semiconductor devices within the circuit electrically connected to wiring, which is in turn connected to metal electrodes that are used to provide electrical connections between the integrated circuit and the circuit board or other upper level device that the integrated circuit is to be connected to (col. 1, ln. 15-45). At the time of the invention, it would have been obvious to one of ordinary art to build the metal electrode of Parrish on a wire because, as is taught by Mertol, it is conventional in the art to provide wiring within the integrated circuit to electrically connect the semiconductor devices on the substrate with the electrode pads that will provide connections to upper level devices.

Regarding claim 2, Parrish discloses that the metallic element that produces the eutectic reaction with tin is indium.

Regarding claim 3, Parrish discloses that the temperature at which the metallic element of the second layer produces the eutectic reaction with tin is no higher than 221°C.

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parrish et al. (US 6,550,665) in view of Mertol et al. (US 6,818,996) as applied to claim 7 above, and further in view of Homma et al. (US 6,569,752).

Regarding claim 4, Parrish does not disclose forming third, fourth and fifth metallic layers between the second layer and the wire. Like Parrish, Homma discloses a method of joining a semiconductor substrate having aluminum pads to a circuit card. Homma discloses that laminates of Cu, Au, and Ni can all be used between the aluminum pad and the tin/indium layer to provide a barrier between the tin/indium layer and the aluminum pad (col. 2, ln. 23-49). At

Art Unit: 2822

the time of the invention, it would have been obvious to one of ordinary skill in the art to use laminates of Cu, Au and Ni to form a barrier layer between the aluminum pad and the tin/indium layers of Parrish, as taught by Homma, because the barrier layer prevents undesirable diffusion of the aluminum and tin/indium molecules.

Regarding claim 5, Parrish discloses that the metal electrodes may be formed by electroless deposition (col. 6, ln. 16-26).

### ***Response to Arguments***

Applicant's arguments filed September 7, 2005 have been fully considered.

Regarding the rejection of claim 6 as being unpatentable over Parrish in view of Mertol, the Examiner agrees with Applicant's argument that the limitations added to claim 6 by the amendment filed on September 7, 2005 are sufficient to overcome the Parrish and Mertol references.

Regarding the rejection of former claim 1 and current claim 7 as being unpatentable over Parrish in view of Mertol, Applicant argues that Parrish allegedly fails to disclose forming a metal electrode with the structure recited in claim 7 that is separate from a circuit card. However, claim 7 does not recite a metal electrode that is separate from a circuit card. There are no limitations in claim 7 that distinguish the structure being claimed from the invention of Parrish at the stage when the two substrate are pressed together prior to the heat reflowing step as described in column 6, lines 35-41 of Parrish.

### ***Allowable Subject Matter***

Claim 6 is allowed.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Massingill et al. disclose forming an electrode on a substrate that includes layers of tin and indium (col. 16, ln. 41-col. 17, ln. 25).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

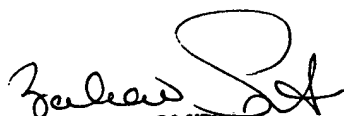
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Art Unit: 2822

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN

November 28, 2005

  
ZANDRA V. SMITH  
PRIMARY EXAMINER  
11/28/05